

Abstract of the Disclosure

Methods, compositions, and systems relating to the stable transduction of primary cells of the hematopoietic system and/or hematopoietic stem cells. A method for stable transduction of primary cells of the hematopoietic system and/or hematopoietic stem cells, comprising contacting, *in vitro* or *ex vivo*, the surface of the cells with both a lentiviral vector and at least one molecule which binds the cell surface, and culturing the cells in a ventilated vessel comprising two or more layers under conditions conducive to growth and/or proliferation, wherein the vessel is suitable for culturing at least about 100 million cells. Use of the transduced primary cells to treat, diagnose, alleviate or prevent a tumor or infection in a subject is also disclosed. A system comprising a vessel or flask to grow the primary cells in is also described.